

Visual Approaches to Teaching Classification

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Abstract

Teaching classification extends beyond teaching any one classification system, but involves a variety of thinking approaches to the possibilities of how to organize. Teaching classification in the 21st century involves recognizing that the traditional parking of materials co-exists with more flexible ways of classifying new formats, objects, digital files, etc. Involving students in the logical and systematic underpinnings of various classification systems along with the technological advancements that offer new ways to organize and sort launches the thinking process. Classroom simulations serve to introduce students to a range of classification problems, including organization of objects and images along with discussions of user perspectives and anticipation of future use of the item. The group simulations and discussions surface new issues while presenting basic concepts through active participation.

“... Visual knowledge acquired in the past helps not only in detecting the nature of an object or action appearing in the visual field; it also assigns the present object a place in the system of things constituting our total view of the world. Thus almost every act of perception involves subsuming a given particular phenomenon under some visual concept—an operation most typical of thinking.” Rudolf Arnheim, *Visual Thinking*

Background

Initial thinking about visual approaches combined interactive exercises utilized in the traditional classroom setting with visual simulations suitable for the online classroom. Mathewson (1999) stresses that visual-spatial thinking and employing visuals to “identify, locate, and think about objects” is a fundamental cognitive process. He states:

“Scientific creativity can be considered as an amalgam of three closely allied mental formats: images; metaphors; and unifying ideas (themes).” (p. 33)

Trinidade, Fiolhais and Almeida (2002) emphasize that graphics, including static and dynamic representations are powerful tools when words and gestures are poor (p. 473). The goal of engaging the imagination, letting students discover new approaches rather than passively learning concepts out of a context, appears consistent with classification as a “virtual language system whose use must be learned and continuously and consciously applied” (Beghtol, 1996, p. 100).

Classification is the act of grouping like things together. These so called “things” can be concrete entities, ideas of the entities, or abstractions. Although human perception can distinguish between like groupings of animals for example, specifically stating characteristics that that are shared or are different is not as easy to achieve. Classification identifies the relationships between things and classes of things. In the process, classification serves as a map of knowledge. (Buchanan, 1979, p. 9-10) A simple class, is where the relationship defines one kind of thing. Composite classes contain different

kinds of things. A relationship does not define one kind of thing. Relationships may include hierarchical relationships based on the principle of subordination or inclusion.

The traditional method is to divide into successively narrower classes, which will include all of the elemental, superimposed and compound classes which the scheme may have to accommodate, arranged in an order displaying their hierarchical relationships (Buchanan, p. 27). The enumerative scheme classes with more than one elemental component listed ready-made, while with the faceted scheme the classifier will have to make multi-element classes by synthesis. Another component of classification is broader and narrower order, where broader classes should file before narrower classes (Buchanan, p. 41)

In addition to taking new perspectives on evaluating classification theory and application, Star (1998) details common methodical issues that Ranganathan struggled with in devising a more flexibly searchable faceted classification approach. Contextual components are core considerations in this analysis.

Albrechtsen and Jacob (1998) discuss bibliographic classification as a structure for a document collection and concepts guiding the searcher into knowledge domains of a collection. Limitations to this approach are the one-size-fits all, deeming all users the same in their search strategies for retrieval. Hjørland and Albrechtsen (1999) focus on the broader social background that each user brings to the search and retrieval process.

Setting the stage

In setting the stage for the simulation exercises, an overview of classification is provided. Labeling, creating a descriptive record, logical groupings of items, are discussed along with consistency in labeling, defining labels and attributes, granularity, and employing a consistent naming system through controlled vocabularies.

Labeling of categories, indexing content whether a homogeneous collection or heterogeneous collection of unrelated objects, are presented in the context of consistent naming, establishing relationships and envisioning retrieval of one or combinations of items. Organizational approaches such as alphabetical, chronological, geographical, or other arrangements are briefly introduced.

Scientific classification illustrated by the Aristotelian dichotomy “creatures found in soil” with/without a shell, with/without legs, etc. and other taxonomic systems used in the sciences for flora and fauna are based on study of the specimen. Different taxonomic systems are examined for physical attributes that guided the groupings of plants and animals.

Bibliographic classification systems started with the premise of dividing up large subject fields, one characteristic at a time. This systematic approach grouped things into classes depending on the degree of likeness. The Dewey Decimal Classification System and the

Library of Congress Classification System briefly introduce two different approaches to library classification.

Ambiguous organizational approaches, based on subjective judgments, examples being the yellow pages of the telephone book, or subject catalogs are presented along with a short exercise: What is this about? These systems relying on subject analysis are difficult to design and maintain. Topical organizational systems, task oriented systems, audience specific systems, and assigning subject headings or index terms illustrate varying perspectives based on knowledge of the subject, and context for subject.

As the assigned task involves organization for retrieval, and the environment is a web one, a brief overview of site architectures is presented to induce thinking about navigating. The simplicity of a sequential organizational structure, predictable, and linear was contrasted with the more complex non-linear hyperlinked system. The latter introduces more flexibility as well as complexity for searching and retrieval. What does this mean for organization and retrieval? What does this mean for categorization and subject assignment?

Exercises

The exercises that follow are based on organization of information simulations developed and refined since 1995. These exercises are designed to engage student thinking about issues in organizing and retrieval, in a course designed to present fundamental concepts. The stage is set for further study in cataloging and classification and other areas of knowledge organization.

Visually, the approach is like working a zoom lens. Pulling the lens in provides the widest field of view, a broad sweep of issues for study. Fully extended, details emerge and further analysis is possible. Most students in the introductory organization of information course are new to Library and Information Science, therefore, one objective is to actively engage thinking about what information professionals do and why information professionals are important in designing, organizing, and assisting users in retrieving from access tools.

The Learning Objectives

- Simple objects, complex thinking
- Team decision making
- Perspective differences within teams
- Groupthink on organizational approaches
- Perspective differences among teams
- Perspectives of different user groups
- Sorting, searching in different ways

- Settling on an approach/approaches
- Harmonization of efforts

Simulation Exercise #1: Introduction to Organization

Note: Collection consists of 15 buttons all in the same color palette, i.e. shades of gray, shades of red, shades of blue, etc.



Sample Collection: Gray-black buttons

Instructions:

In teams, examine the collection provided and design a web store. Consider issues involved in organizing the inventory, how individual items will be described, stored, and retrieved. Consider who will be visiting the web store and what will they be seeking.

- Similarities and differences among items in the collection
- Description of individual items, vocabulary for retrieving items in various ways, and how items would be grouped
- Develop a record structure for an item in the collection
- Draw a structure of the organizational scheme chosen
- Could additional items fit the structure of your system
- Outline the issues discussed and rationale for organizational decisions

Simulation Exercise #1: Selected Results

Each team presented the organizational structure and although all teams had the same collection albeit in different color palettes, approaches to the organizational challenges varied. Reported below are selected results reflecting the thought processes followed in articulating then drawing the organizational approach.

Example #1:

Thinking:

Similarities

- Color
- Material
- Object
- Number with same design

Differences

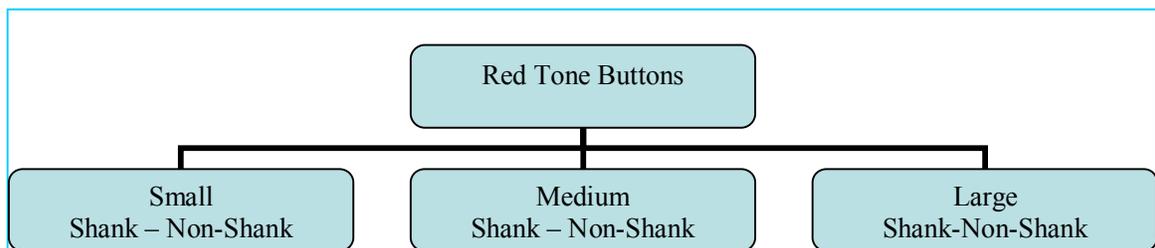
- Shank/Non-shank
- Number of holes
- Size
- Smooth/textured
- Metallic/non-metallic
- Variations in color
- Dull versus shiny
- Round or other shape

Description of items for retrieval:

- | | |
|-----------------|----------------------------------|
| Size | Ex. 1/2" 5/8" |
| Shank | Yes/No |
| Holes | 2 or 4 |
| Shape | Round or other |
| Color/texture | Solid, marble, metallic, jeweled |
| Color intensity | Light, medium, dark |

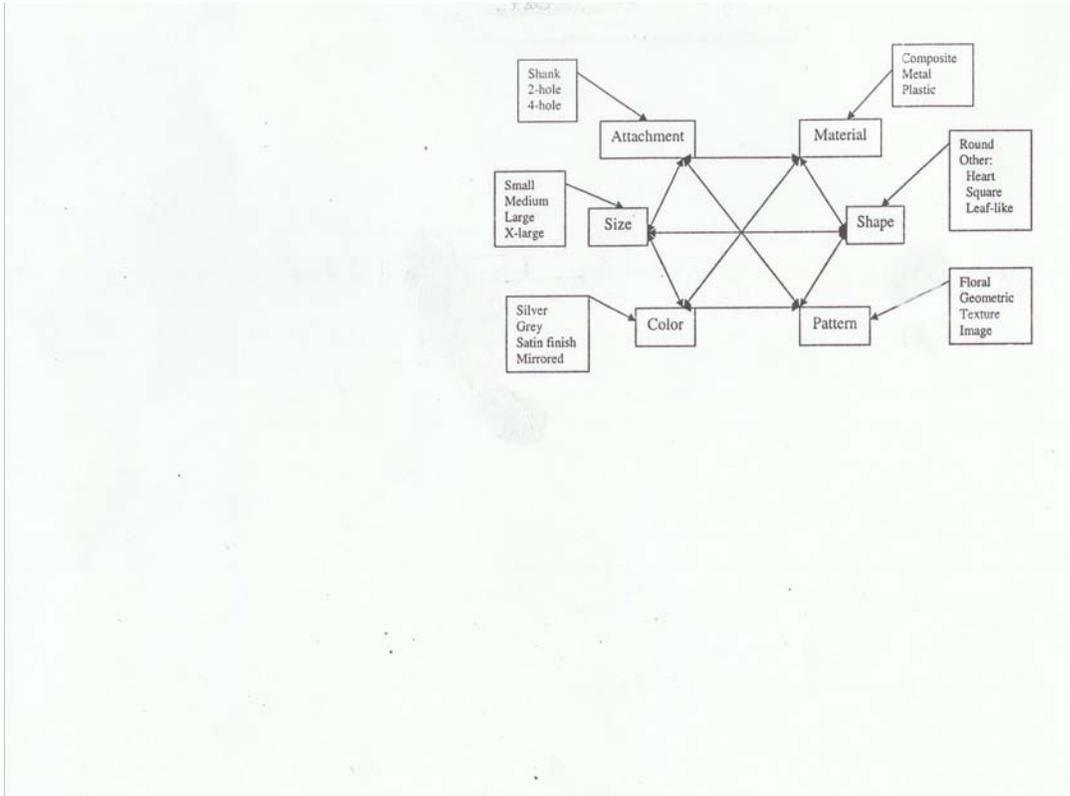
Example #1 reflects initial team thinking about the objects themselves and the beginnings of a descriptive record structure. Defining the terminology was recognized as an issue.

Example #2:



Example #2 continued further division with number of holes under the non-shank grouping. Shank (loopy thing as referred to by some) warranted further definition.

Example #3:



Example #3: This group envisioned a linked structure in which each category was defined with specific attributes.

Discussion:

Each team presented their structure, rationale, and terminology discussed. The most common organizational approach was the chart structure in Example #2. There were attempts to precisely define the color, light reflecting quotient (LRQ), shape, or details of each item in the collection. .

Areas for discussion:

- Defining what a button is
- Defining terminology associated with the collection
- Cultural context for the button and its use
- Type of garment
- Cost, year of manufacture
- Socioeconomic status
- Different user groups and their retrieval needs

- Other uses for the button

Albeit enjoyable, considering the broader range of organization and retrieval issues was the purpose of this exercise from the outset. Simple objects lead to team decision making, different perspectives and dialog about how to organize. The sorting, searching, and how to retrieve an item or clusters of items from the collection provided lively discussion. The question at the end: What if all of the button collections were to be combined into one larger collection? Was there an organizational approach that would incorporate them all?

Simulation Exercise #2: Content Analysis

Note: For copyright reasons, author photographs rather than copyrighted postcards are used for this report.

This exercise is used to illustrate the challenges of determining the content of a visual image and faceted classification systems useful to identifying the essential or persistent characteristics of content objects. The adaptability of this type of classification system for rapidly changing repositories, quickly adding new terminology and promoting a high-level of detailed analysis is reviewed. The concept of controlled vocabulary and free-text searching is introduced.

Instructions:

- Identify elements of the image
- Determine the purpose, message, perspective of the photographer
- Assign terms to the images
- Consider the unifying theme/s of the images
- Determine elements important in classifying the images
- Who would use these images and how would these images be viewed 100 years from now

Image #1:



Image #1 and Image #2 were evaluated separately for content elements, then as considered part of a photographic collection. What elements do the images have in common?

Image #2



Discussion:

This exercise introduced challenges different from the button exercise. Most teams agreed on the core content area conveyed by the images. The finer levels of analysis warranted toning up, namely elements less dominant in the photograph. For example in Image #1, note the homes to the right of the largest rock structure. What do these homes imply about the area? The manicured golf course was obvious, but what is suggested by the homes and golf course on the perimeter of a state park? If classifying this photograph, which element would dominate? How would the classification relate to indexing terms assigned to the image? Would a faceted classification system serve to capture all of the content components of the image?

Elements of Ranganathan's faceted approach to classification were discussed in relation to the two images:

- P (Core entity: Personality)
- M (Matter: visible things)
- E (Energy: action)
- S (Space)
- T (Time: everything changes with time) [Note: geologic time in Image #1]

The emotional elements were also explored. After the "wow" factor of Image #1, discussion revolved around emotional elements conveyed by the image as a whole, then feelings associated with thematic subsets within the image. The subjective feelings were harder to define than the content elements noted above.

What is the unifying force between these two images? This last point of discussion revolved around thematic elements in common. Although more challenging to consider, ultimately common thematic elements were identified.

Summary and Ongoing Research:

These exercises are fun to develop and amazing to observe in action. Early participant excitement settles into reflective analysis as each team member contributes and consensus is reached. Most agree, classification and subject analysis is more difficult than it appears on the surface.

The purpose of the simulations was to activate thinking on organizational issues and expand the field of view for those new to the Library and Information Sciences. Feedback on these exercises and the semester long organizational project validates that this approach can be a successful introduction into a myriad of areas in the information professions.

The goal of using a visual approach to teaching classification is active involvement. Not only can any set of objects be classified in a number of ways, it is easier to understand relationships after viewing items individually, then making connections. Recognizing that each of us brings different experiences, perspectives and understandings to the task is critical to recognizing that achieving a universal understanding is not that straightforward.

Pulling the lens back and taking the widest field of view, these exercises demonstrate retrieval issues for those interested in reference work, systems design challenges for those with that bent, and the obvious challenges for the organizer and analyzer of material in all formats.

Virtual Classroom

The visual and interactive approach taken with these exercises are easily incorporated into an online classroom. Where a live session is conducted and whiteboard available to display images, collections, or examples of classification systems, the issues outlined above can easily be presented. Group sessions can be established for the team meetings, with all teams convening in a larger forum for discussion.

In the virtual environment, visuals, graphics, represent visible and easily manipulated forms which engage students in the analysis of phenomena themselves. In addition, students can interact with each other on common problem-solving or analytical simulations promoting active thinking.

Lastly, students are empowered to immerse themselves in well-designed, engaging exercises and take ownership for the success of the organizational system designed.

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Photographic Credits:

All photographs taken by D. Karpuk

Image #1: Arrowhead Golf Club looking south towards Roxborough State Park (Roxborough, Colorado)

Image #2: Clement Park looking towards Southwest Plaza Mall (Littleton, Colorado)

